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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,231	02/01/2001	Han-Sin Lee	SAM-167	9048

7590 09/25/2003

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EXAMINER

POMPEY, RON EVERETT

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/775,231

Applicant(s)

LEE ET AL.

Examiner

Ron E Pompey

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1-2, and 4-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2 and 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laparra et al. (US 6,319,796) and in further view of Park et al. (US 6,326,282) and Shin et al. (US 6,184,077).

Laparra discloses the steps of:

For claims 1, 2 and 4-6:

etching the exposed semiconductor substrate, using the etching mask pattern as an etching mask, to form a trench;

providing a material layer (40b, fig. 4) on the insulating layer (40a, fig. 4) filling the trench;

planarly etching the material layer and the insulating layer down to a top surface of the etching mask pattern to form a device isolation layer pattern in the trench; and

removing the exposed etching mask pattern (col. 4, Ins. 5-10 and col. 5, Ins. 51-56).

3. Laparra discloses all the steps of claims 1-12 except those described below.

However Park discloses the steps of:

For claims 8-12:

prior to forming the insulating layer:
forming an oxide layer (112, fig. 2D) on the inner wall and bottom of the trench;
forming an oxidation barrier layer (114, fig. 2D) on the oxide layer; and
further comprising forming a capping layer (115, fig. 2D) between the oxidation barrier layer and the insulating layer (col. 4, Ins. 29-52).

Therefore it would have been obvious to those of ordinary skill in the art to combine Park with Laparra, because the layers disclosed by Park are protection layers for the trench.

4. Laparra and Park disclose all the steps of claims 1, 2 and 4-12 except for the material layer being formed being formed at a temperature of 700°C - 800°C and forming a etch-stop layer comprising polysilicon and a HTO layer which are sequentially stacked. However, Shin, column 5, lines 16-18, discloses that an LPCVD method comprises forming HTO and TEOS films at high temperatures in the range claimed by applicant. Therefore, Shin provides a specific temperature for different LPCVD layer, HTO and TEOS films, whereas Laparra just discloses the general conditions that the layer 40b is formed by a LPCVD method, which includes, but not limited to, TEOS. Park even says, column 3, lines 14-15, state that, "A high temperature oxide layer such as HTO and LP-TEOS oxide layers...", HTO and LP-TEOS layers form high temperature oxides. Therefore, from these two references HTO and LP-TEOS are considered as art equivalent layers. Also, that it would have been obvious to one having ordinary skill in the art at the time the invention was made to form an etch-stop layer, comprising polysilicon and a HTO layer which are sequentially stacked, since it

has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Response to Arguments

1. Applicant's arguments filed 6-30-03, pertaining to claims 1, 2 and 4-12, have been fully considered but they are not persuasive.

The applicant argues that the equivalency rejection is improper due to the fact that LP-CVD used to form an LP-TEOS layer and HTO layer use different source gases. However, that has nothing to do with both being formed at high temperatures. Shin discloses, as stated above, that it is well known to form an LP-TEOS ("not less than 650°C") and HTO ("not less than 750°C") layers. Therefore forming the top layer by either of these methods at temperatures around 700 - 800°C, which is within the known range to form insulators by either method, will result in the bottom layer HDP layer being densified without an additional heat treatment. Also, the claims disclose nothing about how the insulator is formed outside of temperature constraints.

Conclusion

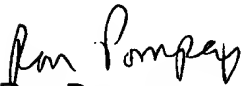
2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (703) 305-3016. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Ron Pompey
Art Unit: 2812
September 22, 2003

John F. Niebling
Supervisory Patent Examiner
Technology Center 2600